

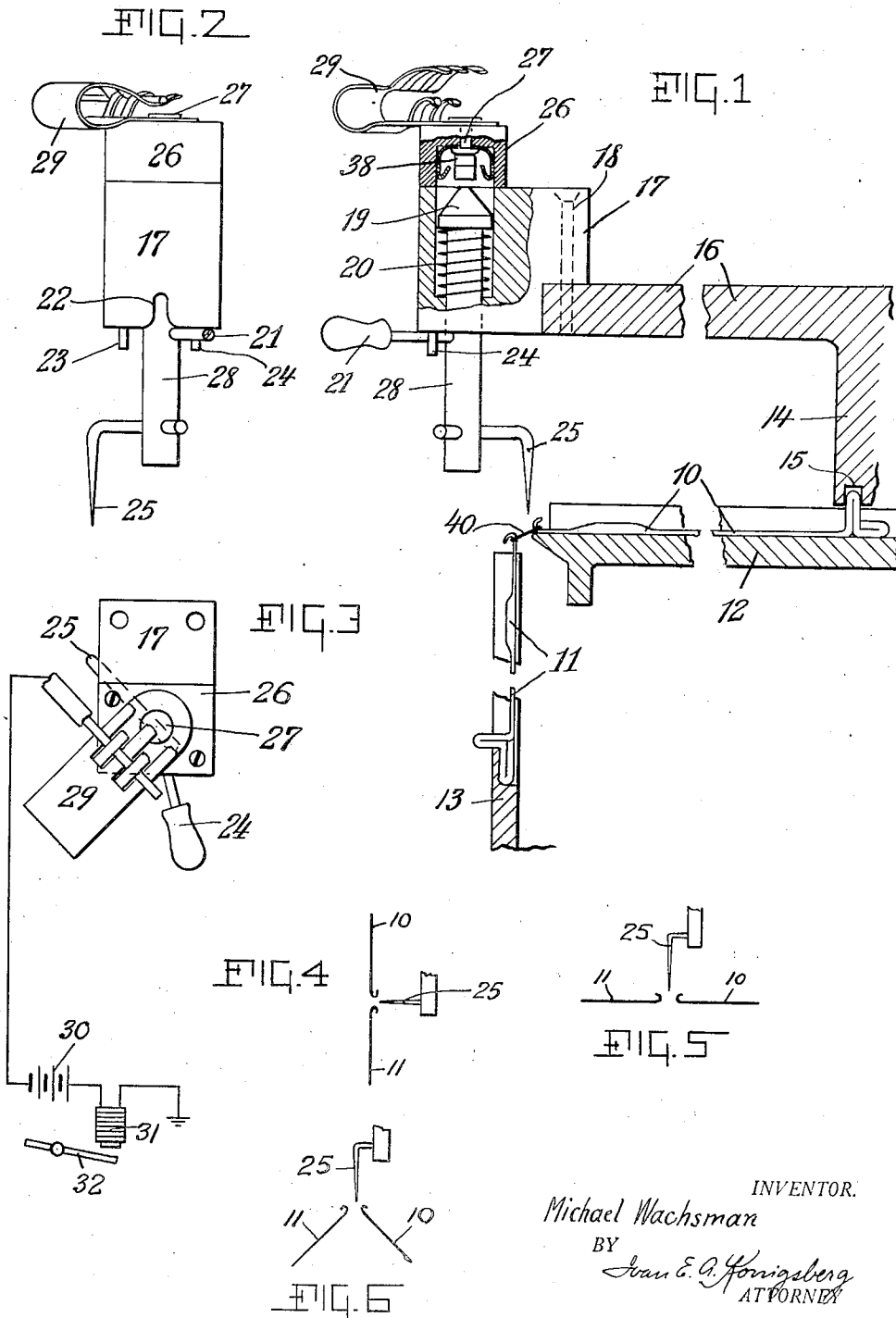
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CIRCUIT CLOSER FOR KNITTING MACHINES

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CIRCUIT CLOSER FOR KNITTING MACHINES

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2 Claims. (Cl. 66—157)

This invention relates to knitting machines and particularly to the mechanism employed for actuating the stop handle or other like member of the drive mechanism of the machine when a needle breaks or when the thread breaks or becomes tangled in and between the needles whereby the regular knitting operation is interfered with.

Devices for actuating the stop handle to stop the machine are commonly called stop motions or stop mechanisms. They are primarily switch mechanisms for closing an electric circuit to actuate the stop handle or like member to stop the machine when anything occurs which necessitates that the machine be stopped.

The object of this invention is to provide such a stop motion or device in the nature of a circuit closer adapted to be mounted upon some part of a knitting machine adjacent the needles so that when a needle breaks or when some other accident or irregular operation occurs in the needle mechanism the circuit closer will automatically close an electric circuit for the purpose described. Another object of the invention is to provide a circuit closer of simple efficient design and construction particularly well adapted for the purpose in view. Another object is to provide a circuit closer adapted for use irrespective of the particular construction or arrangement of the needles in the knitting machine.

There are many different kinds and types of knitting machines and they are usually characterized by some distinctive arrangement of the needles. For the purpose of understanding this invention it will be sufficient to state that every knitting machine is provided with two sets of cooperating knitting needles which may be arranged at an angle to each other or in the same plane or in still some other manner. The needles reciprocate in performing the knitting operation. They may be relatively stationary or movable in addition to their individual reciprocating movements. Whatever the particular arrangement of the needles may be, one object of this invention is to provide a circuit closer which will cause the machine to stop when a needle breaks. Sometimes there may be used so-called sinkers in place of the one set of needles. The invention, however, is also applicable to such construction. In the following specification and in the accompanying drawing only so much of the needle mechanisms are described and shown as is necessary for a complete understanding of the invention.

Accordingly the invention is embodied in a cir-

cuit closer constructed and operated as herein-after set forth and as illustrated in the accompanying drawing in which

Fig. 1 is a view of a portion of a knitting machine equipped with a circuit closer embodying the invention, parts being in section and parts broken away.

Fig. 2 is a view of the circuit closer looking at the left in Figure 1.

Fig. 3 is a top view of the circuit closer including a wiring diagram.

Figs. 4, 5 and 6 are diagrammatic views illustrating the use of the circuit closer with different types of needle mechanisms.

Referring to Figure 1 the needle mechanism of a knitting machine is identified by one set of horizontally disposed needles represented by the knitting needle 10 and another set of vertically disposed needles represented by the knitting needle 11. The needles 10 are supported in slots in a dial 12 and the needles 11 are supported in slots in a cylinder 13. The needles reciprocate in their own axes as is well known. The operating mechanism for the needles 10 is represented at 14 which includes an operating cam 15. The portion 16 of the operating mechanism is sometimes called the locking arm and the circuit closer is secured to such locking arm. In this specification the term support is used to designate that portion of a knitting mechanism which is used to support the circuit closer in operative position.

The circuit closer itself consists of a body 17 of metal adapted to be secured to the support 16 by screws 18 for instance. The body is bored to contain a switch member or circuit closing member 28 in the form of a rotatable pin having a pointed terminal head 19. A spring 20 urges the pin upward, but the pin is held in a lower circuit open position by a handle 21 which prevents upward movement of the pin when said handle is turned in under the body 17 as shown in the drawing. When the pin is rotated, by means to be described later, into a position where the handle coincides with a slot 22, see Figure 2, the pin is free to be moved upwards by the spring. The handle is for the purpose of resetting the pin 19 in its lower circuit open position. The handle is turned sidewise against either one of two stop pins 23 and 24. Near the bottom the pin 19 carries a needle contactor 25 in the form of a steel pin which may be bent as shown.

On top of the body 17 is secured a piece of non-conducting material 26 which supports an electric terminal consisting of a rivet 27 which carries a four pointed contact socket member 28

within the piece 26 and a spring terminal clip 29 on top of said piece. When the switch member 28 is moved upwards by the spring the head 19 makes contact with the socket member 38. The particular construction of these two members insures quick good wiping contact. The terminal clip 29 is made particularly strong and sturdy as indicated in the drawing.

When contact is made between the members 18 and 38 an electrical circuit is closed, Figure 3. The circuit includes a source of electrical energy 30 and a magnet 31. When the magnet is energized it actuates a stop handle or like member 32 to stop the driving mechanism of the knitting machine. Such mechanism is not shown as it forms no part of this invention.

The normal position of the parts is as shown in Figure 1 and the electric circuit is open. In the instance illustrated, the needle supporting members may rotate together around a common center while the needles reciprocate to knit the garment which as it grows hangs down within the cylinder 13 as is known in the art. In such case, the circuit closer support 16 is stationary. The contactor 25 is positioned so that it will not interfere with the normal operation of the needles or the yarn or thread 40. However, should a needle 10 break, the broken portion will remain extended from the dial 12, or it will be thrown outward or upwards. In either case, such a broken needle will directly contact with the contactor 25 or it will cause bunching of the yarn or perhaps engage one of the needles 11 thus preventing normal operation. As a consequence, such broken portion or the bunch of yarn will engage the contactor 25 and rotate the pin 28 so that the handle 21 will be moved in under the slot 22 and as a consequence the switch member 28 will automatically move upwards to close the circuit and the machine will stop. Likewise if one of the needles 11 should break, the broken piece may fly upwards and become entangled with the other needles and bunching of the yarn will also occur. Again the contactor 25 will be engaged, the switch will close the circuit and the machine will stop.

In some machines the support 16 rotates and the needles are stationary except for the reciprocating knitting operation and of course the circuit closer will operate to stop the machine as set forth above. When the cause of the trouble has been attended to, the switch member 28 is reset in open position by using the handle 21. Depending upon the direction of movement of the needles with respect to the contactor 25, the switch member 28 is reset either right or left against the stop pin 23 or 24 so that the contactor points in a direction opposite to that of the movement of the needles or of the support 16 to insure quick operation in case of breakage.

Figures 4 to 6 illustrate diagrammatically other forms of needle mechanisms with the con-

tactor 25 in operative relation. Thus in Figure 4 the needles reciprocate in the same vertical plane. In Figure 5 the needles represent a flat bed machine where the needles move laterally beneath the contactor or the latter moves laterally between the needles. Figure 6 illustrates still another form of needles. The latter and the contactor are laterally movable relative to each other. Of course in all cases the needles reciprocate individually to perform the knitting operation.

It will be seen therefore that the circuit closer according to this invention may be used with several different types of knitting mechanisms. The invention has been tested in practice and found to be entirely successful. The automatic and instant stopping of the machine prevents further accidents and waste.

It will also be understood that the dimensions and other details of the circuit closer mechanism may be arranged to suit particular installations and types of knitting machines. Such changes and other alterations may be made without departing from the principle of the invention and within the scope of the appended claims.

I claim:—

1. A circuit closing device for knitting machines comprising a support, an electric circuit terminal thereon, a plunger adapted to contact said terminal to close the circuit, a contactor member secured to the plunger, an operating pin in the plunger for normally maintaining the plunger in circuit open position and for placing the contactor member in either one of two predetermined operative positions with respect to the knitting needles of the machine, stop pins in said support defining the said predetermined operative positions, a notch located in said support in predetermined relation to the stop pins and a spring for moving the plunger into circuit closing position when the said pin has been operated into engagement with the notch in the said support in the event of failure of the knitting operation.

2. A circuit closing device for knitting machines comprising a support, an electric circuit terminal thereon, a rotatable plunger slidably mounted in said support and adapted to contact said terminal to close the circuit, a contactor member secured to the plunger, two stop pins on the bottom of the support which latter has a notch positioned between the said two stop pins, a handle in the plunger for normally maintaining the plunger in circuit open position and for placing the contactor member in one of two predetermined positions determined by the engagement of the said handle with either of the said two stop pins and a spring for moving the plunger into circuit closing position when said plunger has been rotated to move the handle into alignment with the said notch in the support.

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